Middle East Journal of Scientific Research 2013 vol.16 N5, pages 692-701

Changes of bacterial community structure in experimental ponds after contamination of phosphorus and cadmium

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Abstract

Features of the structure of bacterioplankton and bacteriobenthos were investigated in seasonal dynamics in experimental ponds with loads of phosphates and cadmium. Adding of cadmium at the background of phosphates decreased the number of cells of bacterioplankton containing polyphosphates and percent polyphosphate-accumulating bacteria in the bacteriobenthos. Based on the known mechanisms for failure of polyphosphates in the presence of heavy metals, it has been suggested that the polyphosphates accumulated by cells of bacterioplankton and bacteriobenthos were used for detoxification of cadmium after its inclusion in the experimental ponds. In open experimental pond, the load for cadmium at the background of phosphates caused a major change in the composition of bacterioplankton. Probably in an overgrown experimental pond, the main role in the accumulation of cadmium belonged to higher aquatic plants. It was found that higher aquatic plants had a strong impact on the complex structure of bacterioplankton and bacteriobenthos. Due to the presence of cattail in experimental ponds in conditions of declining of trophic ability, we detected a quite serious changes directed towards increasing the proportion of polyphosphate-accumulating bacteria in the structure of bacterial communities.

http://dx.doi.org/10.5829/idosi.mejsr.2013.16.05.11928

Keywords

Bacterial community, Experimental ponds, Phosphorus and cadmium